

Appl. No. 09/728,881
Amdt. dated 10/08/2004
Reply to Office action of 06/08/2004

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (currently amended):

A method comprising:

scheduling a grant for a virtual output queue associated with a destination port wherein the virtual output queue having the smallest theoretical departure time is scheduled if the theoretical departure time is less than a current time;

receiving a message indicating that a destination port of a multiservice network is congested; and

reducing stopping the increment of the current time to reduce incoming traffic to the congested port to a guaranteed bandwidth of traffic until the destination port is uncongested.

2. (original):

The method of claim 1 wherein the network is selected from the group consisting of:

Asynchronous Transfer Mode (ATM) network, Frame Relay (FR) network, voice network, Circuit Emulation Service (CES) network, and Internet Protocol (IP) network.

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3.-5. (cancelled)

6. (currently amended):

The method of claim 1, ~~claim 4~~, wherein scheduling a grant further comprises

scheduling a grant to one of the virtual output queues associated with the congested destination port using either a round robin scheduling method or a priority based scheduling method if no theoretical departure time is less than the current time. method:

7. (currently amended):

An apparatus comprising:

means for scheduling a grant for a virtual output queue associated with a destination port wherein the virtual output queue having the smallest theoretical departure time is scheduled if the theoretical departure time is less than a current time;

means for receiving a message indicating that a destination port of a multiservice is congested; and

means for reducing-stopping the increment of the current time to reduce incoming traffic to the congested port to a guaranteed bandwidth of traffic until the destination port is uncongested.

8. (original):

The apparatus of claim 7 wherein the network is selected from the group consisting of:

Asynchronous Transfer Mode (ATM) network, Frame Relay (FR) network, voice network, Circuit Emulation Service (CES) network, and Internet Protocol (IP) network.

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9.-11. (cancelled)

12. (currently amended):

The apparatus of claim 10, wherein said means for scheduling a grant further comprises
means for scheduling a grant to a virtual output queue using either a round robin
scheduling method or a priority based scheduling method.

13. (currently amended):

A computer readable medium having instructions which, when executed by a processing
system, cause the system to:

schedule a grant for a virtual output queue associated with a destination port wherein the
virtual output queue having the smallest theoretical departure time is scheduled if the
theoretical departure time is less than a current time;

receive control cells indicating that a destination port of a multiservice network is
congested; and

stop the increment of the current time to reduce incoming traffic to the congested port to
a guaranteed bandwidth of traffic until the destination port is uncongested.

14. (original):

The medium of claim 13 wherein the network is selected from the group consisting of:

Asynchronous Transfer Mode (ATM) network, Frame Relay (FR) network, voice
network, Circuit Emulation Service (CES) network, and Internet Protocol (IP) network.

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15.-17. (cancelled)

18. (currently amended):

The medium of claim 13, claim 16, wherein the executed instructions further cause the system to ~~schedule a grant further comprises~~

schedule a grant to a virtual output queue using either a round robin scheduling method or a priority based scheduling method if no theoretical departure time is less than the current time, method.

19. (currently amended):

An apparatus comprising:

a scheduler to schedule a grant for a virtual output queue associated with a destination port wherein the virtual output queue having the smallest theoretical departure time is scheduled if the theoretical departure time is less than a current time;

a receiver to receive a message indicating that a destination port of a multiservice network is congested; and

a traffic manager to stop the increment of the current time to reduce incoming traffic to the congested port to a guaranteed bandwidth of traffic until the destination port is uncongested.

20. (original):

The apparatus of claim 19 wherein the network is selected from the group consisting of:

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Asynchronous Transfer Mode (ATM) network, Frame Relay (FR) network, voice network, Circuit Emulation Service (CES) network, and Internet Protocol (IP) network.

21.-22. (cancelled)

23. (new):

The method of claim 1, further comprising:

selecting a guaranteed bandwidth of traffic for the virtual output queue;
reducing the guaranteed bandwidth when a speedup signal for the virtual output queue is off for a predetermined amount of time, wherein reducing the guaranteed bandwidth continues until the guaranteed bandwidth is zero or the speedup signal is on; and
rate-limiting traffic of the virtual output queue to the guaranteed bandwidth until the destination port is uncongested.

24. (new):

The method of claim 23, wherein reducing the guaranteed bandwidth further comprises reducing the guaranteed bandwidth by a small fixed amount.

25. (new):

The method of claim 24, further comprising increasing the guaranteed bandwidth if the speedup signal is on and the guaranteed bandwidth is less than what was originally selected.

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26. (new):

The method of claim 25, wherein increasing the guaranteed bandwidth further comprises increasing the guaranteed bandwidth by a large fixed amount.

27. (new):

The apparatus of claim 7, further comprising:

means for selecting a guaranteed bandwidth of traffic for the virtual output queue;

means for reducing the guaranteed bandwidth when a speedup signal for the virtual output queue is off for a predetermined amount of time, wherein reducing the guaranteed bandwidth continues until the guaranteed bandwidth is zero or the speedup signal is on;

and

means for rate-limiting traffic of the virtual output queue to the guaranteed bandwidth until the destination port is uncongested.

28. (new):

The apparatus of claim 27, wherein means for reducing the guaranteed bandwidth further comprises means for reducing the guaranteed bandwidth by a small fixed amount.

29. (new):

The apparatus of claim 28, further comprising means for increasing the guaranteed bandwidth if the speedup signal is on and the guaranteed bandwidth is less than what was originally selected.

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30. (new):

The apparatus of claim 29, wherein means for increasing the guaranteed bandwidth further comprises means for increasing the guaranteed bandwidth by a large fixed amount.

31. (new):

The medium of claim 13, wherein the executed instructions further cause the system to:

select a guaranteed bandwidth of traffic for the virtual output queue;

reduce the guaranteed bandwidth when a speedup signal for the virtual output queue is

off for a predetermined amount of time, wherein reducing the guaranteed bandwidth

continues until the guaranteed bandwidth is zero or the speedup signal is on; and

rate-limit traffic of the virtual output queue to the guaranteed bandwidth until the

destination port is uncongested.

32. (new):

The medium of claim 31, wherein the guaranteed bandwidth is reduced by a small fixed amount.

33. (new):

The medium of claim 32, wherein the executed instructions further cause the system to

increase the guaranteed bandwidth if the speedup signal is on and the guaranteed bandwidth

is less than what was originally selected.

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34. (new):

The medium of claim 33, wherein the guaranteed bandwidth is increased by a large fixed amount.

35. (new):

The apparatus of claim 19 wherein the scheduler is further to schedule a grant to one of the virtual output queues associated with the congested destination port using either a round robin scheduling method or a priority based scheduling method if no theoretical departure time is less than the current time.

36. (new):

The apparatus of claim 19, wherein the traffic manager is further:

- to select a guaranteed bandwidth of traffic for the virtual output queue;
- to reduce the guaranteed bandwidth when a speedup signal for the virtual output queue is off for a predetermined amount of time, wherein reducing the guaranteed bandwidth continues until the guaranteed bandwidth is zero or the speedup signal is on; and
- to rate-limit traffic of the virtual output queue to the guaranteed bandwidth until the destination port is uncongested.

37. (new):

The apparatus of claim 36, wherein the traffic manager is further to reduce the guaranteed bandwidth by a small fixed amount.

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38. (new):

The apparatus of claim 37, the traffic manager is further to increase the guaranteed bandwidth if the speedup signal is on and the guaranteed bandwidth is less than what was originally selected.

39. (new):

The apparatus of claim 38, wherein the traffic manager is further to increase the guaranteed bandwidth by a large fixed amount.